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Our Case No. 9281-4213  
Client Reference No. S US00165

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: )  
Satoshi Kawai )  
Serial No. To be Assigned )  
Filing Date: Herewith )  
For Digital Broadcast Receiving Tuner )  
Suitable for Miniaturization )

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Prior to examination of the above-identified application, please amend the application as follows:

**In the Drawings**

Please replace Fig. 1 with the corrected Fig. 1 enclosed herewith. The corrections to the figure have been marked in red. Applicant respectfully requests that the Examiner approve the corrections. Applicant will submit corrected formal drawings upon receiving a Notice of Allowance.

**In the Specification**

Please rewrite the paragraph on page 7, lines 2-8 as follows:

(Amended) Also, the grounding conductor layer 5 is, as shown in Fig. 2, structured such that there is provided a first remainder 5a on the demodulation unit region R2 side; the high-frequency unit region R1 is provided with a deletion unit (i.e. a non-conductive portion) 5b; and there is further provided a second remainder 5c to oppose to the lower portion of the IC component 3a having the direct conversion unit H1.

Please rewrite the paragraph on page 7, lines 21-27 as follows:

(Amended) Particularly, in the high-frequency unit of the first tuner T1 for a television having such a structure, the deletion unit 5b is provided whereby capacitance between the wiring pattern 2a and the grounding conductor layer 6 is reduced to improve the performance of the first tuner T1, and the first remainders 5a and 6a of the grounding conductor layers 5 and 6 electrically shield between the first and second tuners T1 and T2.

Please rewrite the paragraph on page 8, lines 1-9 as follows:

(Amended) Also, the IC component 3a is structured so as to incorporate a wiring portion (not shown) by an exterior portion (not shown) made of synthetic resin or the like. When this IC component 3a is connected to the wiring pattern 2a, the wiring portion of the IC component 3a is separated from the surface of the insulating board 1 so that the second remainder 5c located at the lower portion of the IC component 3a opposes to the wiring portion of the IC component 3a located at a more distant position than the wiring pattern 2a.

Please rewrite the paragraph on page 8, lines 10-16 as follows:

(Amended) In the first tuner T1 for a television, therefore, the capacitance between the first tuner T1 and the remainder 5c is small; the influence on the performance can be reduced; the distance between the second remainder 5c and the wiring pattern 2a can be shortened; and a grounding connection of the circuit in the high-frequency unit can be shortened, thus making it possible to ensure the grounding effect.

Please rewrite the paragraph beginning on page 8, line 17 and ending on page 9, line 3 as follows:

(Amended) Also, particularly, in the high-frequency unit of the second tuner T2 for a VCR, the deletion unit 6b is provided whereby capacitance between the wiring pattern 2b and the grounding conductor layer 5 is reduced to improve the performance of the second tuner T2; and the IC component 3b is, as in the case of the IC component 3a, structured so as to incorporate a wiring portion (not shown) by an exterior portion (not shown) made of synthetic resin or the like. When this IC component 3b is connected to the wiring pattern 2b, the wiring portion of the IC component 3b is separated from the surface of the insulating board 1 so that the

second remainder 6c located at the lower portion of the IC component 3b opposes to the wiring portion of the IC component 3b located at a more distant position than the wiring pattern 2b.

Please rewrite the paragraph on page 9, lines 4-10 as follows:

(Amended) In the second tuner T2 for a VCR, therefore, the capacitance between the second tuner T2 and the remainder 6c is small; the influence on the performance can be reduced; the distance between the second remainder 6c and the wiring pattern 2b can be shortened; and the grounding connection of the circuit in the high-frequency unit can be shortened, thus making it possible to ensure the grounding effect.

Please rewrite the paragraph on page 9, lines 15-21 as follows:

(Amended) According to the present invention, it is possible to provide a lower-priced digital broadcast receiving tuner having higher productivity as well as a lower number of components than a conventional tuner because, on one surface of the insulating board 1, there is formed the first tuner T1 while, on the other surface thereof, there is formed the second tuner T2, and therefore a single insulating board 1 can be shared.

Please rewrite the paragraph on page 10, lines 5-16 as follows:

(Amended) Also, since a structure is arranged such that the first and second tuners T1 and T2 have a high-frequency unit and a demodulation unit respectively, and the high-frequency unit of the first tuner T1 and the demodulation unit of the second tuner T2, and the demodulation unit of the first tuner T1 and the high-frequency unit of the second tuner T2 are arranged at a position opposite to each other with the multi-layer board interposed therebetween respectively, it is possible to keep a large distance between the high-frequency unit of the first tuner T1 from that of the second tuner T2. This decreases the interference with each other, thus making it possible to provide a digital broadcast receiving tuner with good performance.

Please rewrite the paragraph beginning on page 10, line 17 and ending on page 11, line 4 as follows:

(Amended) Also, the multi-layer board is formed of at least three layers; between the lamination layers, there are provided at least two grounding conductor layers 5 and 6; in a region R1 in which the high-frequency unit is provided, the grounding conductor layers 5 and 6 arranged near the high-frequency unit are provided with deletion units 5b and 6b; and in a range R2 in which the demodulation unit is provided, the grounding conductor layers 5 and 6 arranged near the demodulation unit are provided with first remainders 5a and 6a to increase a facing distance between the wiring patterns 2a and 2b of the high-frequency unit and the first remainders 5a and 6a, and therefore, the capacitance between the wiring patterns 2a and 2b and the grounding conductor layers 5 and 6 can be reduced to thereby enhance the performance of the first and second tuners T1 and T2.

Please rewrite the paragraph on page 11, lines 5-16 as follows:

(Amended) In addition, the high-frequency unit has IC components 3a and 3b, each having a direct conversion unit including an oscillator and a mixer, and the grounding conductor layer 5, 6 arranged near the high-frequency unit is provided with a second remainder 5c, 6c to oppose the lower portion of the IC component 3a, 3b. Therefore, the capacitance between the IC component 3a, 3b and the remainder 6c is small; the influence on the performance can be reduced; the distance between the second remainder 5c, 6c and the wiring pattern 2a, 2b can be shortened; and the grounding connection of the circuit in the high-frequency unit can be shortened, thus making it possible to ensure the grounding effect.

## In the Claims

Please rewrite Claims 1-5 as follows:

1. (Amended) A digital broadcast receiving tuner comprising:  
an insulating board having a first surface and a second surface;  
a first wiring pattern disposed on the first surface and a second wiring pattern disposed on the second surface; and  
a first tuner disposed on the first surface and a second tuner disposed on the second surface.
2. (Amended) The digital broadcast receiving tuner according to Claim 1, wherein the insulating board further comprises a stacked multi-layer board, and the

first and second tuners are electrically shielded from each other by a grounding conductor layer provided within the multi-layer board.

3. (Amended) The digital broadcast receiving tuner according to Claim 2, wherein the first and second tuners each comprise a high-frequency unit and a demodulation unit, and wherein the high-frequency unit of the first tuner and the demodulation unit of the second tuner are arranged at a first position, and the demodulation unit of the first tuner and the high-frequency unit of the second tuner are arranged at a second position, the first and second positions being opposite to each other with the multi-layer board interposed therebetween.

4. (Amended) The digital broadcast receiving tuner according to Claim 3, wherein the multi-layer board comprises at least the two grounding conductor layers between lamination layers, each grounding conductive layer has deletion units and a first remainder, the deletion units of a first grounding conductive layer more proximate to a particular high-frequency unit of one of the first and second tuners than a second grounding conductive layer are arranged more proximate to the particular high-frequency unit than the first remainder of the one of the first and second tuners and the first remainder of the first grounding conductive layer is arranged more proximate to a particular demodulation unit of the one of the first and second tuners than the deletion units of the one of the first and second tuners to thereby increase a facing distance between the wiring pattern of the particular high-frequency unit and the corresponding first remainder.

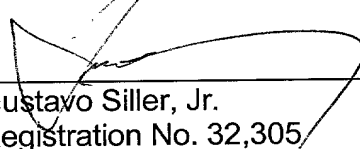
5. (Amended) The digital broadcast receiving tuner according to Claim 4, wherein each high-frequency unit comprises an IC component having a direct conversion unit including an oscillator and a mixer, and each grounding conductor layer has a second remainder that opposes a lower portion of the corresponding IC component.

6. (New) The digital broadcast receiving tuner according to Claim 5, wherein the second remainder of each grounding conductor layer is disposed between deletion units of the corresponding grounding conductor layer.

## REMARKS

Applicant has rewritten portions of the specification and Claims 1-5 for grammatical purposes only and added new Claim 6. No new matter has been added as a result of this amendment. The changes from the previous version to the rewritten version are shown in attached Appendix A.

Respectfully submitted,

  
\_\_\_\_\_  
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**APPENDIX A**  
**Attorney Docket No. 9281-4213**  
**Digital Broadcast Receiving Tuner Suitable for Miniaturization**  
**Satoshi Kawai**

**In the Specification**

Please amend the paragraph on page 7, lines 2-8 as follows:

(Amended) Also, the grounding conductor layer 5 is, as shown in Fig. 2, structured such that there is provided a first remainder 5a on the demodulation unit region R2 side; the high-frequency unit region R1 is provided with a deletion unit (i.e. a non-conductive portion) 5b; and there is further provided a second remainder 5c to oppose to the lower portion of the IC component 3a having the direct conversion unit H1.

Please amend the paragraph on page 7, lines 21-27 as follows:

(Amended) Particularly, in the high-frequency unit of the first tuner T1 for a television having such a structure, the deletion unit 5b is provided whereby capacitycapacitance between the wiring pattern 2a and the grounding conductor layer 6a is reduced to improve the performance of the first tuner T1, and the first remainders 5a and 6a of the grounding conductor layers 5 and 6 electrically shield between the first and second tuners T1 and T2.

Please amend the paragraph on page 8, lines 1-9 as follows:

(Amended) Also, the IC component 3a is structured so as to incorporate a wiring portion (not shown) by an exterior portion (not shown) made of synthetic resin or the like. When this IC component 3a is connected to the wiring pattern 2a, the wiring portion of the IC component 3a ~~retracts~~ is separated from the surface of the insulating board 1 so that the second remainder 5c located at the lower portion of the IC component 3a opposes to the wiring portion of the IC component 3a located at a more distant position than the wiring pattern 2a.

Please amend the paragraph on page 8, lines 10-16 as follows:

(Amended) In the first tuner T1 for a television, therefore, the capacitycapacitance between the ~~first~~ first tuner T1 and the remainder 5c is small; the influence on the performance can be reduced; the distance between the second

remainder 5c and the wiring pattern 2a can be shortened; and a grounding ~~course~~connection of the circuit in the high-frequency unit can be shortened, thus making it possible to ensure the grounding effect.

Please amend the paragraph beginning on page 8, line 17 and ending on page 9, line 3 as follows:

(Amended) Also, particularly, in the high-frequency unit of the second tuner T2 for a VCR, the deletion unit 6b is provided whereby ~~capacity~~capacitance between the wiring pattern 2b and the grounding conductor layer 5a is reduced to improve the performance of the second tuner T2; and the IC component 3b is, as in the case of the IC component 3a, structured so as to incorporate a wiring portion (not shown) by an exterior portion (not shown) made of synthetic resin or the like. When this IC component 3b is connected to the wiring pattern 2b, the wiring portion of the IC component 3b ~~retracts~~is separated from the surface of the insulating board 1 so that the second remainder 6c located at the lower portion of the IC component 3b opposes to the wiring portion of the IC component 3b located at a more distant position than the wiring pattern 2b.

Please amend the paragraph on page 9, lines 4-10 as follows:

(Amended) In the second tuner T2 for a VCR, therefore, the ~~capacity~~capacitance between the second tuner T2 and the remainder 6c is small; the influence on the performance can be reduced; the distance between the second remainder 6c and the wiring pattern 2b can be shortened; and the grounding ~~course~~connection of the circuit in the high-frequency unit can be shortened, thus making it possible to ensure the grounding effect.

Please amend the paragraph on page 9, lines 15-21 as follows:

(Amended) According to the present invention, it is possible to provide a lower-priced digital broadcast receiving tuner having higher productivity as well as a ~~less~~lower number of components than a conventional tuner because, on one surface of the insulating board 1, there is formed the first tuner T1 while, on the other surface thereof, there is formed the second tuner T2, and therefore a single insulating board 1 can be shared.

Please amend the paragraph on page 10, lines 5-16 as follows:



(Amended) Also, since a structure is arranged such that the first and second tuners T1 and T2 have a high-frequency unit and a demodulation unit respectively, and the high-frequency unit of the first tuner T1 and the demodulation unit of the second tuner T2, and the demodulation unit of the first tuner T1 and the high-frequency unit of the second tuner T2 are arranged at a position opposite to each other with the multi-layer board interposed therebetween respectively, it is possible to keep a large distance between the high-frequency unit of the first tuner T1 from that of the second tuner T2, ~~by a large distance, and both of them less interfere~~ This decreases the interference with each other, thus making it possible to provide a digital broadcast receiving tuner with good performance.

Please amend the paragraph beginning on page 10, line 17 and ending on page 11, line 4 as follows:

(Amended) Also, the multi-layer board is formed of at least three layers; between the lamination layers, there are provided at least two grounding conductor layers 5 and 6; in a region R1 in which the high-frequency unit is provided, the grounding conductor layers 5 and 6 arranged near the high-frequency unit are provided with deletion units 5b and 6b; and in a range R2 in which the demodulation unit is provided, the grounding conductor layers 5 and 6 arranged near the demodulation unit are provided with first remainders 5a and 6a to increase a facing distance between the wiring patterns 2a and 2b of the high-frequency unit and the first remainders 5a and 6a, and therefore, the ~~capacity~~ capacitance between the wiring patterns 2a and 2b and the grounding conductor layers 5 and 6 can be reduced to thereby enhance the performance of the first and second tuners T1 and T2.

Please amend the paragraph on page 11, lines 5-16 as follows:

(Amended) In addition, the high-frequency unit has IC components 3a and 3b, each having a direct conversion unit including an oscillator and a mixer, and the grounding conductor layer 5, 6 arranged near the high-frequency unit is provided with a second remainder 5c, 6c to oppose the lower portion of the IC component 3a, 3b. Therefore, the ~~capacity~~ capacitance between the IC component 3a, 3b and the remainder 6c is small; the influence on the performance can be reduced; the distance between the second remainder 5c, 6c and the wiring pattern 2a, 2b can be

shortened; and the grounding ~~connection~~ of the circuit in the high-frequency unit can be shortened, thus making it possible to ensure the grounding effect.

## In the Claims

Please amend Claims 1-5 as follows:

1. (Amended) A digital broadcast receiving tuner comprising; wherein the ~~digital broadcast recording tuner has~~

an insulating board ~~provided with~~ having a first surface and a second surface;

a first wiring pattern each disposed on both surfaces thereof, the first surface and a second wiring pattern disposed on the second surface; and wherein ~~on one surface of the insulating board there is formed~~

a first tuner disposed on the first surface and ~~while on the other surface thereof there is formed a second tuner~~ disposed on the second surface.

2. (Amended) The digital broadcast receiving tuner according to Claim 1, wherein the insulating board ~~is structured off~~ further comprises a stacked multi-layer board, and the first and second tuners are electrically shielded from each other by a grounding conductor layer provided within the multi-layer board.

3. (Amended) The digital broadcast receiving tuner according to Claim 2, wherein the first and second tuners ~~have each~~ comprise a high-frequency unit and a demodulation unit ~~respectively~~, and wherein the high-frequency unit of the first tuner and the demodulation unit of the second tuner are arranged at a first position, and the demodulation unit of the first tuner and the high-frequency unit of the second tuner are arranged at a second position, the first and second positions being opposite to each other with the multi-layer board interposed therebetween ~~respectively~~.

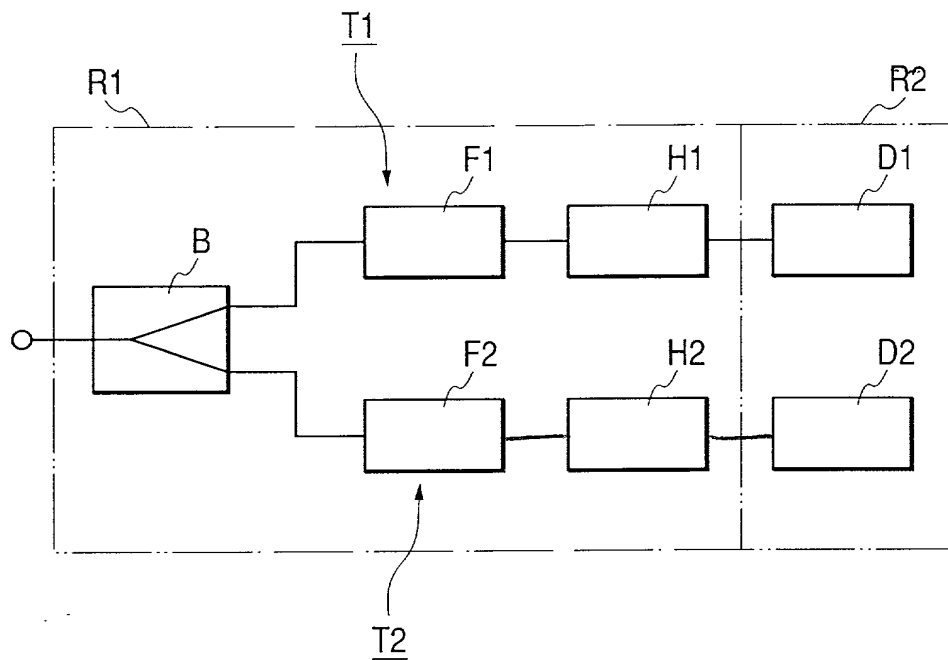
4. (Amended) The digital broadcast receiving tuner according to Claim 3, wherein the multi-layer board ~~is formed of~~ comprises at least the two grounding conductor layers ~~three layers, wherein between lamination layers, there are provided at least the two grounding conductor layers, wherein each grounding conductive layer has deletion units and a first remainder, the deletion units of a first grounding conductive layer more proximate to a particular high-frequency unit of one of the first~~

and second tuners than a second grounding conductive layer are arranged more proximate to the particular high-frequency unit than the first remainder of the one of the first and second tuners in a region in which the high-frequency unit is provided; the grounding conductor layers arranged near the high-frequency unit are provided with deletion units; and the first remainder of the first grounding conductive layer is arranged more proximate to a particular demodulation unit of the one of the first and second tuners than the deletion units of the one of the first and second tuners wherein in a range in which the demodulation unit is provided, the grounding conductor layers arranged near the demodulation unit are provided with a first remainder to thereby increase a facing distance between the wiring pattern of the particular high-frequency unit and the corresponding first remainder.

5. (Amended) The digital broadcast receiving tuner according to Claim 4, wherein the each high-frequency unit has comprises an IC component having a direct conversion unit including an oscillator and a mixer, and the each grounding conductor layer arranged near the high-frequency unit is provided with has a second remainder to that opposes a lower portion of the IC component more proximate to the second remainder than the second remainder of the other grounding conductor layer.

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**FIG. 1**



**FIG. 2**

